SERVICE MANUAL

FISHER

CA-660

Stereo Amplifier

(EUROPE)

The first name in high fidelity

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SPECIFICATIONS

AMPLIFIER		CA-660
Sine Wave Power (1,000 Hz, k = 1 %)		45 W
Sine Wave Power (20 - 20,000 Hz, k = 0.05 %)		40 W
Music Power		60 W
T.H.D. (rated output)		≦0.05 %
I.M. (rated output)		≦0.05 %
Speaker Damping (8 Ω)		>20
Power Bandwidth		10 Hz - 45,000 Hz
Frequency Response at 50 mW		20 Hz - 20,000 Hz, ±1 dB
Input Sensitivity and Impedance	Phono	2.5 mV/47 kΩ
	Tuner	150 mV/47 kΩ
	Tape	150 mV/47 kΩ
	Aux.	150 mV/47 kΩ
	Microphone	1.6 mV/5 kΩ
Treble Control (10 kHz)		±10 dB
Bass Control (100 Hz)		±10 dB
Loudness (at −30 dB) 100 Hz/10 kHz		+8 dB/+4 dB
Output TAPE		150 mV/1 kΩ
Output PHONES		5 V/100 Ω
Channel Separation		55 dB
S/N Ratio (Aux.)		100 dB
Power Requirements		AC: 220 V, 50 Hz
Power Consumption		240 W
Dimensions (W x H x D)		440 x 134 x 330 mm
Weight (approx.)		9.5 kg

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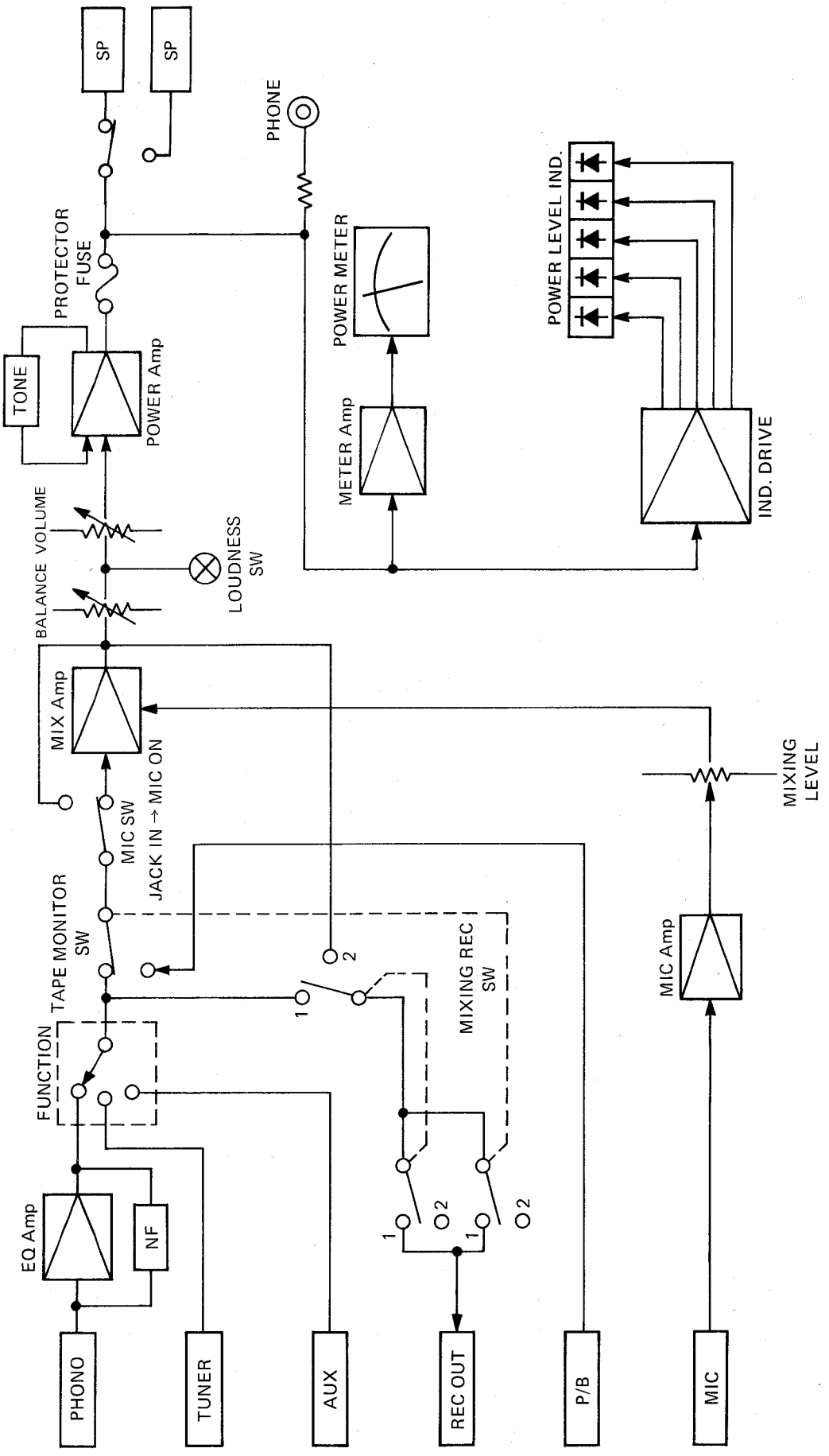
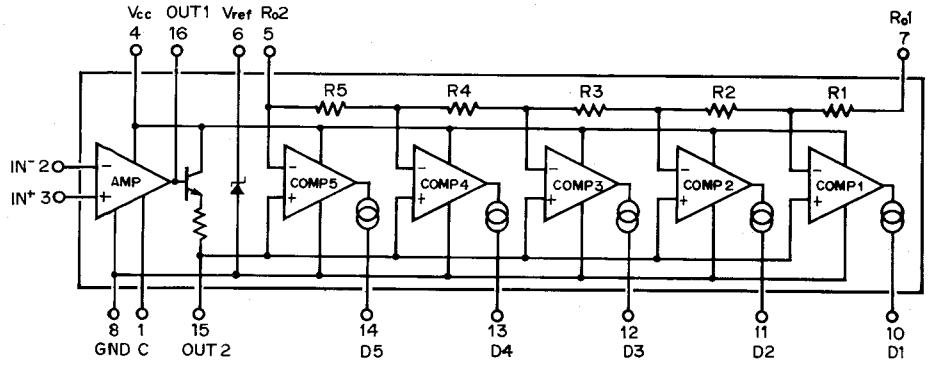
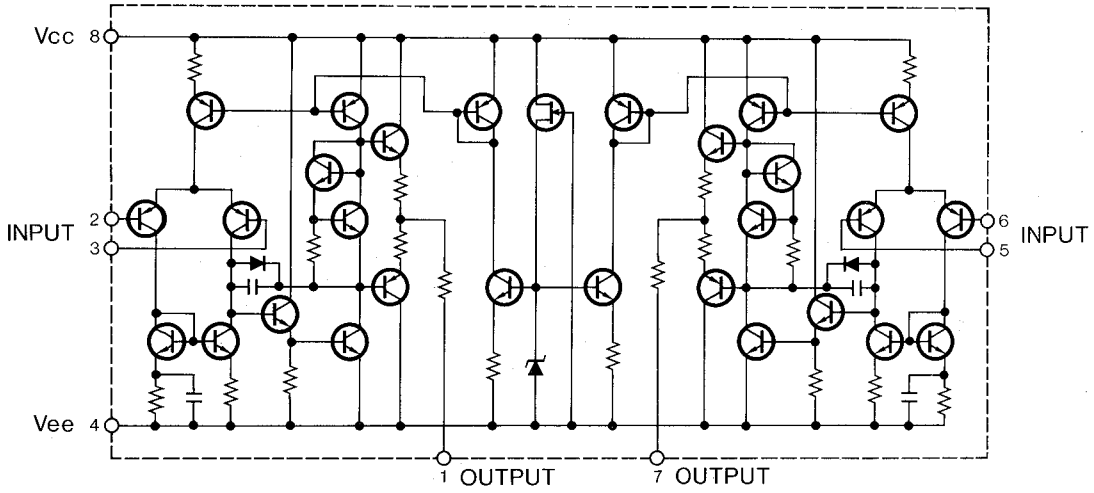
BLOCK DIAGRAM



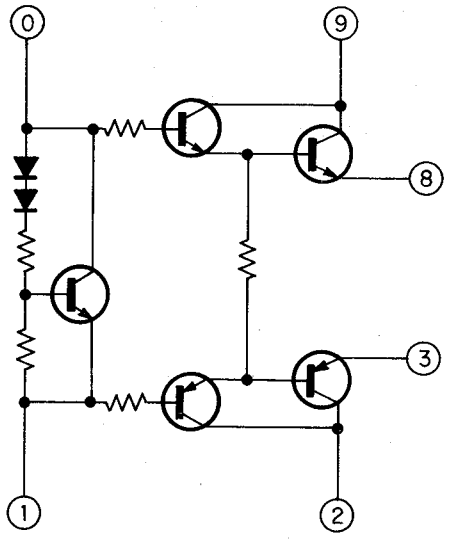
LEVEL METER IC LB1405 SIGNAL FLOW



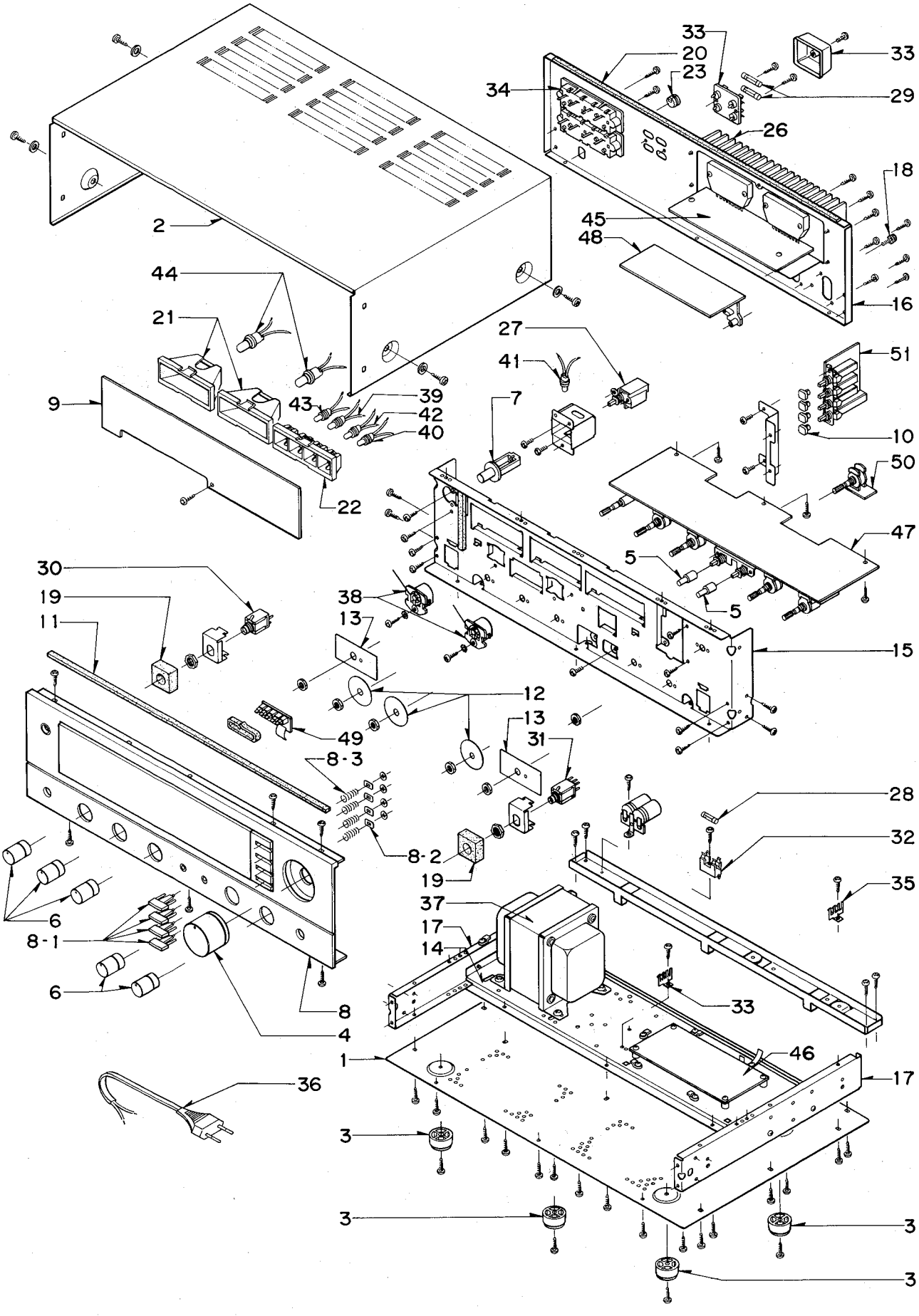
AF AMP IC NJM4559 EQUIVALENT CIRCUIT



POWER AMP IC STK-0040 EQUIVALENT CIRCUIT



CABINET & CHASSIS EXPLODED VIEW



PARTS LIST

PACKING PARTS LIST

Ref. No.	Parts Number	Description
	131 6 1139 78113	Box Corrugate-EXP
	131 6 2119 01362	Bag Polyethylene-EXP
	131 6 3009 28760	Pad

ACCESSORIES PARTS LIST

Ref. No.	Parts Number	Description
	131 6 2719 10801	Bag Fan
	131 6 4119 80705	Explanatory Booklet
	131 6 4519 15700	Guarantee Certificate

CABINET PARTS LIST

Ref. No.	Parts Number	Description
1	131 2 1105 23600	Plate Bottom
2	131 2 1410 21700	Cover
3	131 2 1801 14100	Leg

APPEARANCE PARTS LIST

Ref. No.	Parts Number	Description
4	131 0 1001 48201	Knob (Volume)
5	131 0 1001 49100	Knob (Push Switch)
6	131 0 1001 54500	Knob (Tone)
7	131 0 1001 54600	Knob (Power Switch)
8	131 0 1016 34507	Panel Decorate Assy
8-1	131 2 1601 60600	Knob
8-2	131 2 4220 10501	Ring Snap
8-3	131 2 5101 17300	Spring
9	131 2 1201 34402	Plate Dial
10	131 2 1601 61900	Knob (Push SW, Inside)
11	131 2 5205 15300	Cushion (Panel Control Top)
12	131 2 6113 31800	Shelter
13	131 2 6113 35700	Shelter

CHASSIS PARTS LIST

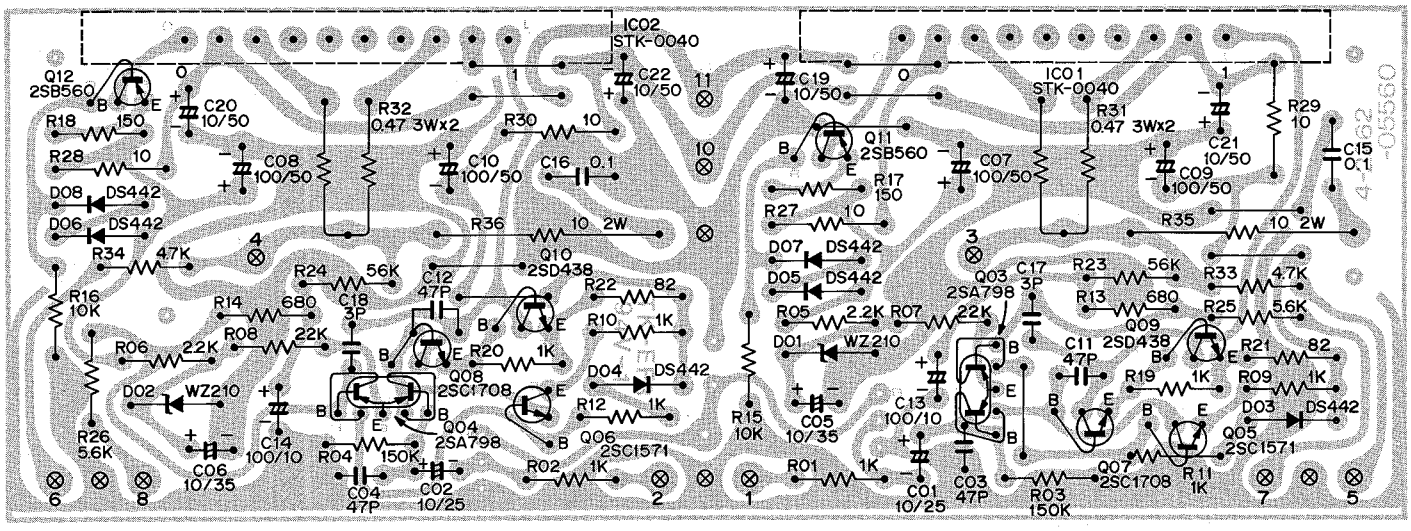
Ref. No.		Parts Number	Description
14	*	131 2 3301 25400	Chassis
15	*	131 2 3305 27600	Panel Front
16	*	131 2 3306 30809	Panel Rear
17	*	131 2 3308 13400	Chassis Sub
18		131 2 4201 17800	Screw (GND)
19		131 2 4208 34700	Spacer
20		131 2 5205 15300	Cushion (Panel Rear Top)
21		131 2 6110 28800	Shelter Light (Meter)
22		131 2 6110 28900	Shelter Light (Ind.)
23		131 2 6111 14200	Bushing (AC Cord)

ELECTRICAL PARTS LIST

Ref. No.		Parts Number	Description
26		131 2 6201 27701	Plate Heat Sink
27		4 2312 02520	Switch Push Power
28		4 2349 20250	Fuse 2 A
29		4 2349 20590	Fuse 4 A
30		4 2352 00030	Jack Headphone (Headphone)
31		4 2352 00430	Jack Headphone (Microphone)
32		4 2359 21021	Fuse Holder
33		4 2359 22031	Fuse Holder
34		4 2372 00680	Speaker Terminal
35		4 2379 21840	Terminal
36		4 2439 20525	Power Cord
37		4 2512 10720	Power Transformer
38		4 5112 00481	Meter Unit
39		4 6122 01500	Pilot Lamp (8V, 200mA) (Tuner)
40		4 6122 01510	Pilot Lamp (8V, 200mA) (Tape)
41		4 6122 01520	Pilot Lamp (8V, 200mA) (Power Ind.)
42		4 6122 01700	Pilot Lamp (8V, 200mA) (Aux.)
43		4 6122 01710	Pilot Lamp (8V, 200mA) (Phono)
44		4 6129 20771	Pilot Lamp (8V, 300mA) (Meter)
45	*	131 0 4001 04080	Power Amp P.C.B. Assy
46	*	131 0 4001 04090	Power Supply P.C.B. Assy
47	*	131 0 4001 04101	Tone P.C.B. Assy
48	*	131 0 4001 04111	Input EQ P.C.B. Assy
49	*	131 0 4001 04121	Power Ind. P.C.B. Assy
50	*	131 0 4001 04141	Main Volume P.C.B. Assy
51	*	131 0 4001 04160	Push Switch P.C.B. Assy
C01		C2GYDP103-A	Ceramic 0.01 μF 400V +100,–0%
C02,03		C1ERF-477A	Electrolytic 470 μF 25WV

*—Not a service part.

POWER AMP P.C.BOARD
(BOTTOM VIEW)



IC PIN NUMBERS VOLTAGES											
SYMBOL No.	DEVICE	1	2	3	4	5	6	7	8	9	10
IC01,02	STK-0040	−1.0V	−43.5V	61mV	—	—	—	—	97mV	43.2V	1.1V

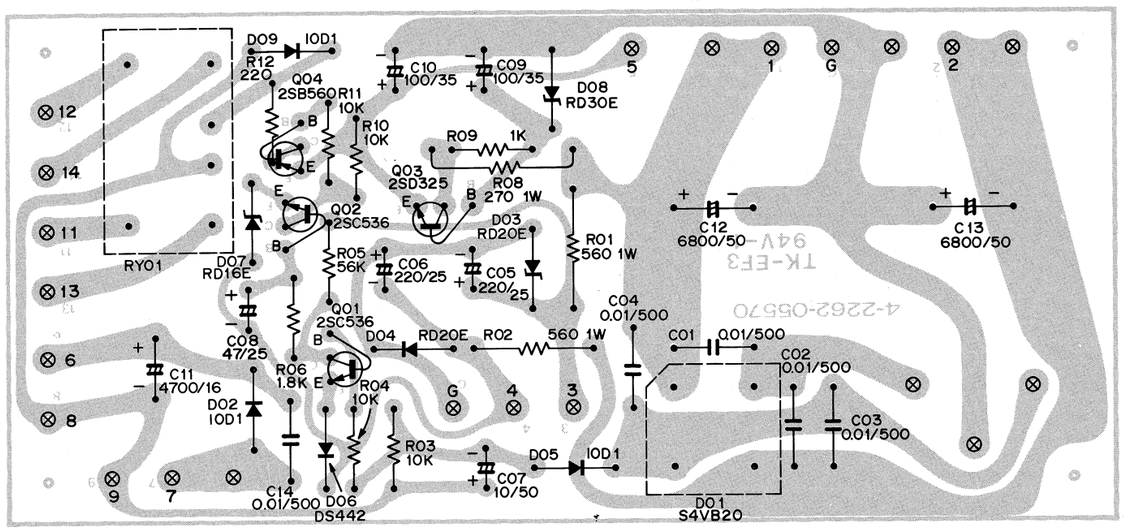
PARTS LIST

POWER AMP P.C.B. Assy
131 0 4001 04080

Ref. No.	Parts Number	Description
	CAPACITORS	
C01,02	C1ERY-106LPA	Electrolytic 10 μF 25V
C03,04	C1HCYK470APA	Ceramic 47 pF 50V ±10%
C05,06	C1VRY-106APA	Electrolytic 10 μF 35V
C07,08	C1HRE-107A	Electrolytic 100 μF 50V
09,10		
C11,12	C1HCYK470APA	Ceramic 47 pF 50V ±10%
C13,14	C1ARY-107APA	Electrolytic 100 μF 10V
C15,16	C1HFAK104A	Mylar 0.1 μF 50V ±10%
C17,18	C1HCYC030APA	Ceramic 3 pF 50V ±0.25%
C19,20	C1HRY-106APA	Electrolytic 10 μF 50V
21,22		
	SEMICONDUCTORS	
D01,02	DJJ-WZ-210	Diode, WZ-210
D03,04	205 5 9040 44210	Diode, DS-442
05,06		
07,08		
IC01,02	206 5 6040 04010	IC, STK-0040
Q03,04	TMM-2SA798--F	TR 2SA798 F, G
Q05,06	203 5 5251 57170	TR 2SC1571 G, H
Q07,08	TMM-2SC1708-F	TR 2SC1708 F, G
Q09,10	203 5 6830 43840	TR 2SD438 D, E
Q11,12	203 5 6840 56040	TR 2SB560 D, E

Ref. No.	Parts Number	Description
	RESISTORS	
R01,02	R2EDZJ102APA	Carbon 1k 1/4W ±5%
R03,04	R2EDZJ154APA	Carbon 150k 1/4W ±5%
R05,06	R2EDZJ222APA	Carbon 2.2k 1/4W ±5%
R07,08	R2EDZJ223APA	Carbon 22k 1/4W ±5%
R09,10	R2EDZJ102APA	Carbon 1k 1/4W ±5%
11,12		
R13,14	R2EDZJ681APA	Carbon 680 1/4W ±5%
R15,16	R2EDZJ103APA	Carbon 10k 1/4W ±5%
R17,18	R2EDZJ151APA	Carbon 150 1/4W ±5%
R19,20	R2EDZJ102APA	Carbon 1k 1/4W ±5%
R21,22	R2EDZJ820APA	Carbon 82 1/4W ±5%
R23,24	R2EDZJ563APA	Carbon 56k 1/4W ±5%
R25,26	R2EDZJ562APA	Carbon 5.6k 1/4W ±5%
R27,28	R2HZPK100A	Fuse 10 1/2W ±10%
29,30		
R31,32	4 2212 00110	Cement 0.47 ohmx2 3W
R33,34	R2EDZJ472APA	Carbon 4.7k 1/4W ±5%
R35,36	R3DXBJ100A	Oxide Metal Film 10 2W ±5%

POWER SUPPLY P.C.BOARD
(BOTTOM VIEW)



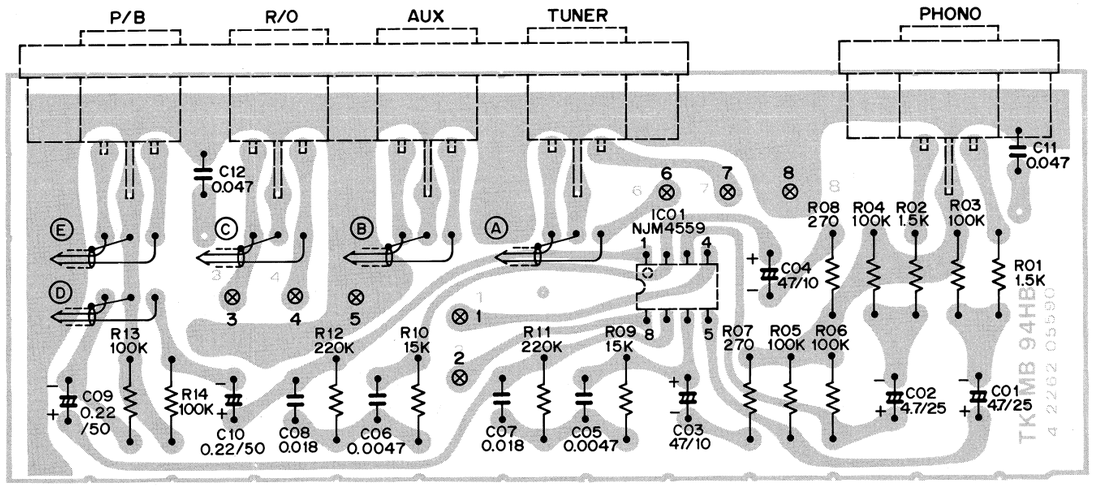
PARTS LIST

POWER SUPPLY P.C.B. Assy
131 0 4001 04090

Ref. No.	Parts Number	Description
RY01	4 2322 00090	Relay
	CAPACITORS	
C01,02 03,04	C2HYDP103A	Ceramic 0.01 μF 500V +100,–0%
C05,06	C1ERE-227A	Electrolytic 220 μF 25V
C07	C1HRY-106APA	Electrolytic 10 μF 50V
C08	C1ERY-476APA	Electrolytic 47 μF 25V
C09,10	C1VRE-107A	Electrolytic 100 μF 35V
C11	C1CRE-478A	Electrolytic 4700 μF 16V
C12,13	4 2232 00380	Electrolytic 6800 μF 50V
C14	C2HYDP103A	Ceramic 0.01 μF 500V +100,–0%
	SEMICONDUCTORS	
D01	DDD-S4VB20---2	Diode, S4VB20
D02	DCC-10D1----NA	Diode, 10D1
D03,04	DNN-RD20EB	Diode, RD20E
D05	DCC-10D1----NA	Diode, 10D1
D06	205 5 9040 44210	Diode, DS-442
D07	DNN-RD-16E	Diode, RD-16E
D08	DNN-RD30E	Diode, RD30E
D09	DCC-10D1----NA	Diode, 10D1
Q01,02	203 5 5000 53660	TR 2SC536 F, G
Q03	203 5 8620 32540	TR 2SD325 D, E
Q04	203 5 6840 56050	TR 2SB560 E, F

Ref. No.	Parts Number	Description			
	RESISTORS				
R01,02	R3AZPK561A	Fuse	560	1W	±10%
R03,04	R2EDZJ103APA	Carbon	10k	1/4W	±5%
R05	R2EDZJ563APA	Carbon	56k	1/4W	±5%
R06	R2EDZJ182APA	Carbon	1.8k	1/4W	±5%
R08	R3AZPK271A	Fuse	270	1W	±10%
R09	R2EDZJ102APA	Carbon	1k	1/4W	±5%
R10,11	R2EDZJ103APA	Carbon	10k	1/4W	±5%
R12	R2EDZJ221APA	Carbon	220	1/4W	±5%

INPUT EQ P.C.BOARD
(BOTTOM VIEW)



IC PIN NUMBERS VOLTAGES									
SYMBOL No.	DEVICE	1	2	3	4	5	6	7	8
IC01	NJM4559	0V	0V	0V	–13.2V	0V	0V	0V	13.7V

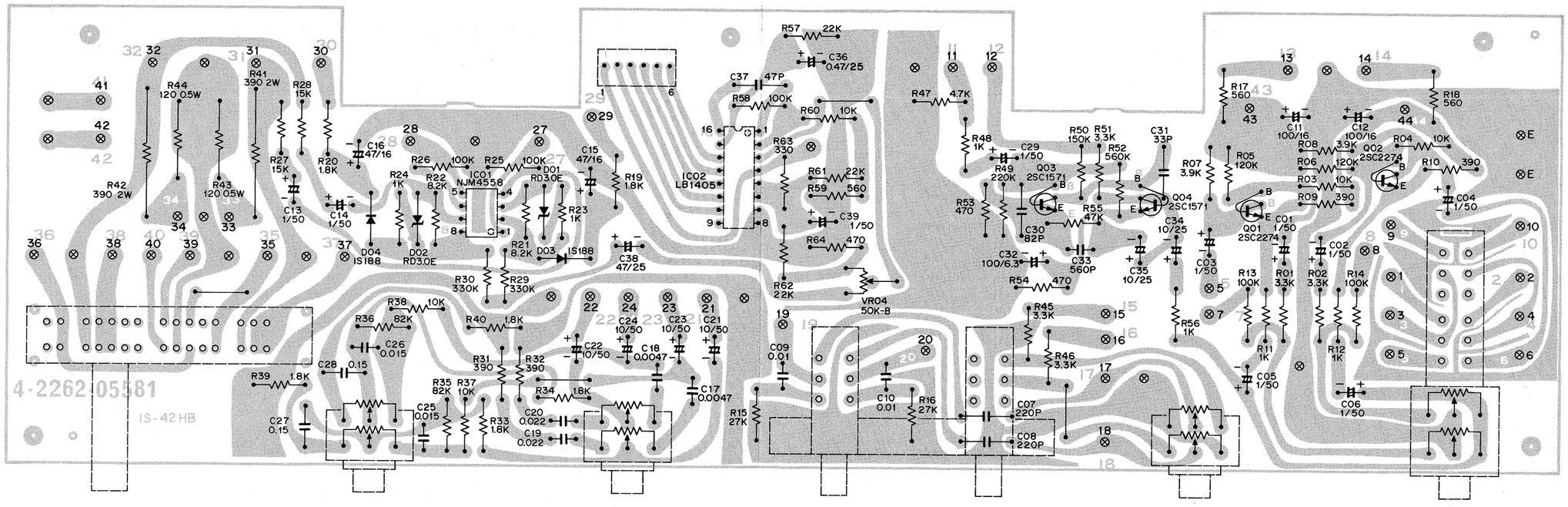
PARTS LIST

INPUT EQ P.C.B. Assy
131 0 4001 04111

Ref. No.	Parts Number	Description
	4 2359 23170	Socket 2P
	4 2359 23180	Socket 4P
	CAPACITORS	
C01,02	C1ERY-475LPA	Electrolytic 4.7 μF 25V
C03,04	C1ARY-476APA	Electrolytic 47 μF 10V
C05,06	C1HFYK472APA	Mylar 0.0047 μF 50V ±10%
C07,08	C1HFYK183APA	Mylar 0.018 μF 50V ±10%
C09,10	C1HRY-224LPA	Electrolytic 0.22 μF 50V
C11,12	C1HYSZ473A	Ceramic 0.047 μF 50V +80,–20%
	SEMICONDUCTORS	
IC01	IJJ-NJM4559DX	IC, NJM4559DX

Ref. No.	Parts Number	Description			
	RESISTORS				
R01,02	R2EDZJ152APA	Carbon	1.5k	1/4W	±5%
R03,04	R2EDZJ104APA	Carbon	100k	1/4W	±5%
05,06					
R07,08	R2EDZJ271APA	Carbon	270	1/4W	±5%
R09,10	R2EDZJ153APA	Carbon	15k	1/4W	±5%
R11,12	R2EDZJ224APA	Carbon	220k	1/4W	±5%
R13,14	R2EDZJ104APA	Carbon	100k	1/4W	±5%

TONE P.C.BOARD
(BOTTOM VIEW)



IC PIN NUMBERS VOLTAGES																	
SYMBOL No.	DEVICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC01	NJM4558	0V	0V	0V	−20V	0V	0V	0V	21.5V	—	—	—	—	—	—	—	—
IC02	LB1405	0.6V	0V	0V	11.4V	2.9V	2.9V	0V	0V	—	9.8V	9.8V	9.8V	10V	9.8V	0V	0.2V

PARTS LIST

TONE P.C.B. Assy
131 0 4001 04101

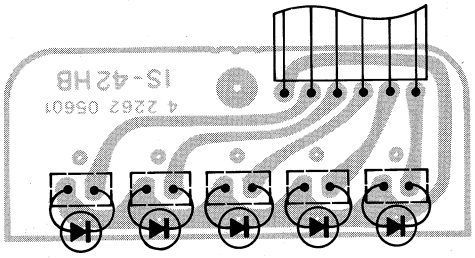
Ref. No.	Parts Number	Description
VR01,02	4 2222 01340	VR 100k-Cx2 (Treble, Bass)
VR03	4 2222 01350	VR 250k-MNx2 (Balance)
VR04	4 2222 01010	VR 50k-B
VR05	4 2222 01360	VR 50k-Bx2 (Mix Volume)
	4 2312 03830	Switch Push 2key
	4 2312 04350	Switch Rotary Slide 6-4
	4 2362 00370	Plug 6P
	CAPACITORS	
C01,02 03,04,05,06	C1HRY-105LPA	Electrolytic 1 µF 50V
C07,08	C1HCZK221BPA	Ceramic 220 pF 50V ±10%
C09,10	C1HFYK103APA	Mylar 0.01 µF 50V ±10%
C11,12	C1CRE-107A	Electrolytic 100 µF 16V
C13,14	C1HRY-105APA	Electrolytic 1 µF 50V
C15,16	C1CRY-476APA	Electrolytic 47 µF 16V
C17,18	C1HFYK472APA	Mylar 0.0047 µF 50V ±10%
C19,20	C1HFYK223APA	Mylar 0.022 µF 50V ±10%
C21,22 23,24	C1HRY-106APA	Electrolytic 10 µF 50V
C25,26	C1HFYK153APA	Mylar 0.015 µF 50V ±10%

Ref. No.	Parts Number	Description
	CAPACITORS	
C27,28	C1HFRK154A	Mylar 0.15 µF 50V ±10%
C29	C1HRY-105LPA	Electrolytic 1 µF 50V
C30	C1HCZJ820SPA	Ceramic 82 pF 50V ±5%
C31	C1HCZJ330SPA	Ceramic 33 pF 50V ±5%
C32	C0JRY-107APA	Electrolytic 100 µF 6.3V
C33	C1HYDK561R	Ceramic 560 pF 50V ±10%
C34,35	C1ERY-106APA	Electrolytic 10 µF 25V
C36	C1ERY-475APA	Electrolytic 4.7 µF 25V
C37	C1HCZJ470SPA	Ceramic 47 pF 50V ±5%
C38	C1ERY-475APA	Electrolytic 4.7 µF 25V
C39	C1HRY-105APA	Electrolytic 1 µF 50V
	SEMICONDUCTORS	
D01,02	DNN-RD3.0E--BX	Diode, RD3.0E
D03,04	202 5 9110 18820	Diode, 1S188FM1
IC01	IJJ-NJM4558DX	IC, NJM4558D
IC02	206 5 2351 40510	IC, LB1405
Q01,02	203 5 7252 27450	TR 2SC2274 E, F
Q03,04	203 5 5251 57170	TR 2SC1571 G, H

Ref. No.	Parts Number	Description			
	RESISTORS				
R01,02	R2EDZJ332APA	Carbon	3.3k	1/4W	±5%
R03,04	R2EDZJ103APA	Carbon	10k	1/4W	±5%
R05,06	R2EDZJ124APA	Carbon	120k	1/4W	±5%
R07,08	R2EDZJ392APA	Carbon	3.9k	1/4W	±5%
R09,10	R2EDZJ391APA	Carbon	390	1/4W	±5%
R11,12	R2EDZJ102APA	Carbon	1k	1/4W	±5%
R13,14	R2EDZJ104APA	Carbon	100k	1/4W	±5%
R15,16	R2EDZJ273APA	Carbon	27k	1/4W	±5%
R17,18	R2EDZJ561APA	Carbon	560	1/4W	±5%
R19,20	R2EDZJ182APA	Carbon	1.8k	1/4W	±5%
R21,22	R2EDZJ822APA	Carbon	8.2k	1/4W	±5%
R23,24	R2EDZJ102APA	Carbon	1k	1/4W	±5%
R25,26	R2EDZJ104APA	Carbon	100k	1/4W	±5%
R27,28	R2EDZJ153APA	Carbon	15k	1/4W	±5%
R29,30	R2EDZJ334APA	Carbon	330k	1/4W	±5%
R31,32	R2EDZJ391APA	Carbon	390	1/4W	±5%
R33,34	R2EDZJ182APA	Carbon	1.8k	1/4W	±5%
R35,36	R2EDZJ823APA	Carbon	82k	1/4W	±5%
R37,38	R2EDZJ103APA	Carbon	10k	1/4W	±5%
R39,40	R2EDZJ182APA	Carbon	1.8k	1/4W	±5%

Ref. No.	Parts Number	Description			
	RESISTORS				
R41,42	R3DXBJ391A	Oxide Metal Film	390	2W	±5%
R43,44	R2HXBJ121A	Oxide Metal Film	120	1/2W	±5%
R45,46	R2EDZJ332APA	Carbon	3.3k	1/4W	±5%
R47	R2EDZJ472APA	Carbon	4.7k	1/4W	±5%
R48	R2EDZJ102APA	Carbon	1k	1/4W	±5%
R49	R2EDZJ224APA	Carbon	220k	1/4W	±5%
R50	R2EDZJ154APA	Carbon	150k	1/4W	±5%
R51	R2EDZJ332APA	Carbon	3.3k	1/4W	±5%
R52	R2EDZJ564APA	Carbon	560k	1/4W	±5%
R53,54	R2EDZJ471APA	Carbon	470	1/4W	±5%
R55	R2EDZJ473APA	Carbon	47k	1/4W	±5%
R56	R2EDZJ102APA	Carbon	1k	1/4W	±5%
R57	R2EDZJ223APA	Carbon	22k	1/4W	±5%
R58	R2EDZJ104APA	Carbon	100k	1/4W	±5%
R59	R2EDZJ561APA	Carbon	560	1/4W	±5%
R60	R2EDZJ103APA	Carbon	10k	1/4W	±5%
R61,62	R2EDZJ223APA	Carbon	22k	1/4W	±5%
R63	R2EDZJ331APA	Carbon	330	1/4W	±5%
R64	R2EDZJ471APA	Carbon	470	1/4W	±5%

POWER IND. P.C.BOARD
(BOTTOM VIEW)



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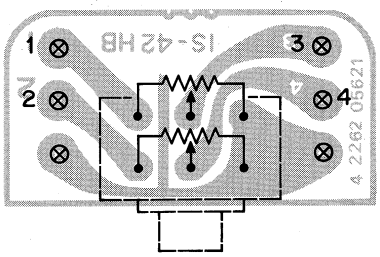
MAIN VOLUME P.C.BOARD
(BOTTOM VIEW)



MAIN VR
200K- Bx2

PARTS LIST

POWER IND. P.C.B. Assy
131 0 4001 04121

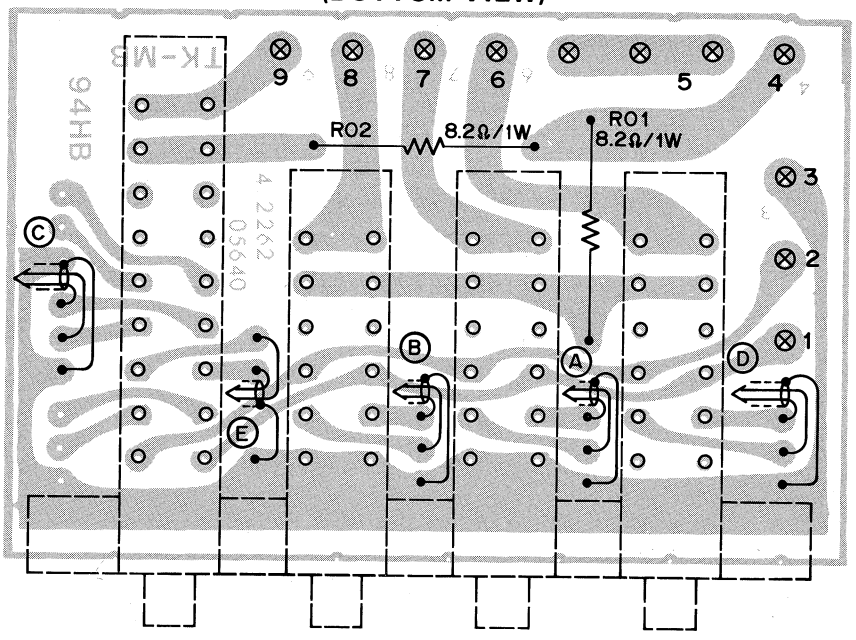
Ref. No.	Parts Number	Description
	DOO-SLP-151B	Diode, SLP-151B (LED)
	131 0 4006 22201	Cord Assy

MAIN VOLUME P.C.B. Assy
131 0 4001 04141

Ref. No.	Parts Number	Description
VR01	4 2222 01690	VR 200k-Bx2

PUSH SWITCH P.C.BOARD

(BOTTOM VIEW)



TAPE MONITOR AUX TUNER PHONO

PARTS LIST

PUSH SWITCH P.C.B. Assy
131 0 4001 04160

Ref. No.	Parts Number	Description
	4 2312 04120	Switch Push 4Key
	RESISTORS	
R01,02	R3AXBJ8R2A	Oxide Metal Film 8.2 ohm 1W

POWER LEVEL INDICATOR ADJUSTMENT

When the components in IC02 LB1405 and Power Amplifier circuit have been replaced, perform the level adjustment as follows;

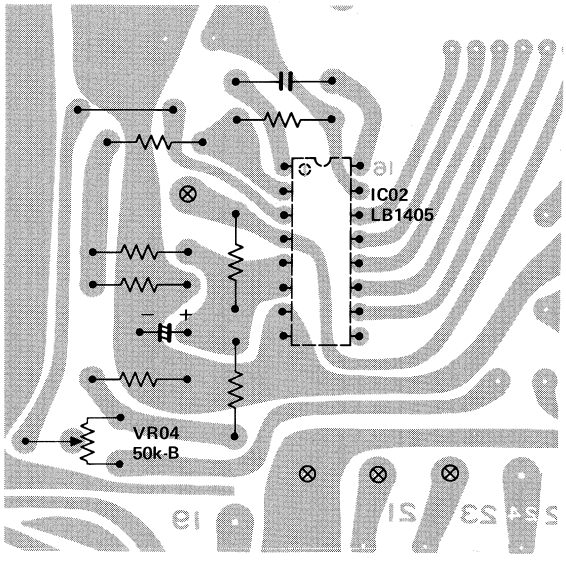
* Measuring Intruments
AF Oscillator, Oscilloscope, VTVM, and 8 ohm Dummy Load

1. Connect AF Oscillator to AUX terminal and connect Oscilloscope, VTVM, and 8 ohm dummy load to SP terminal.

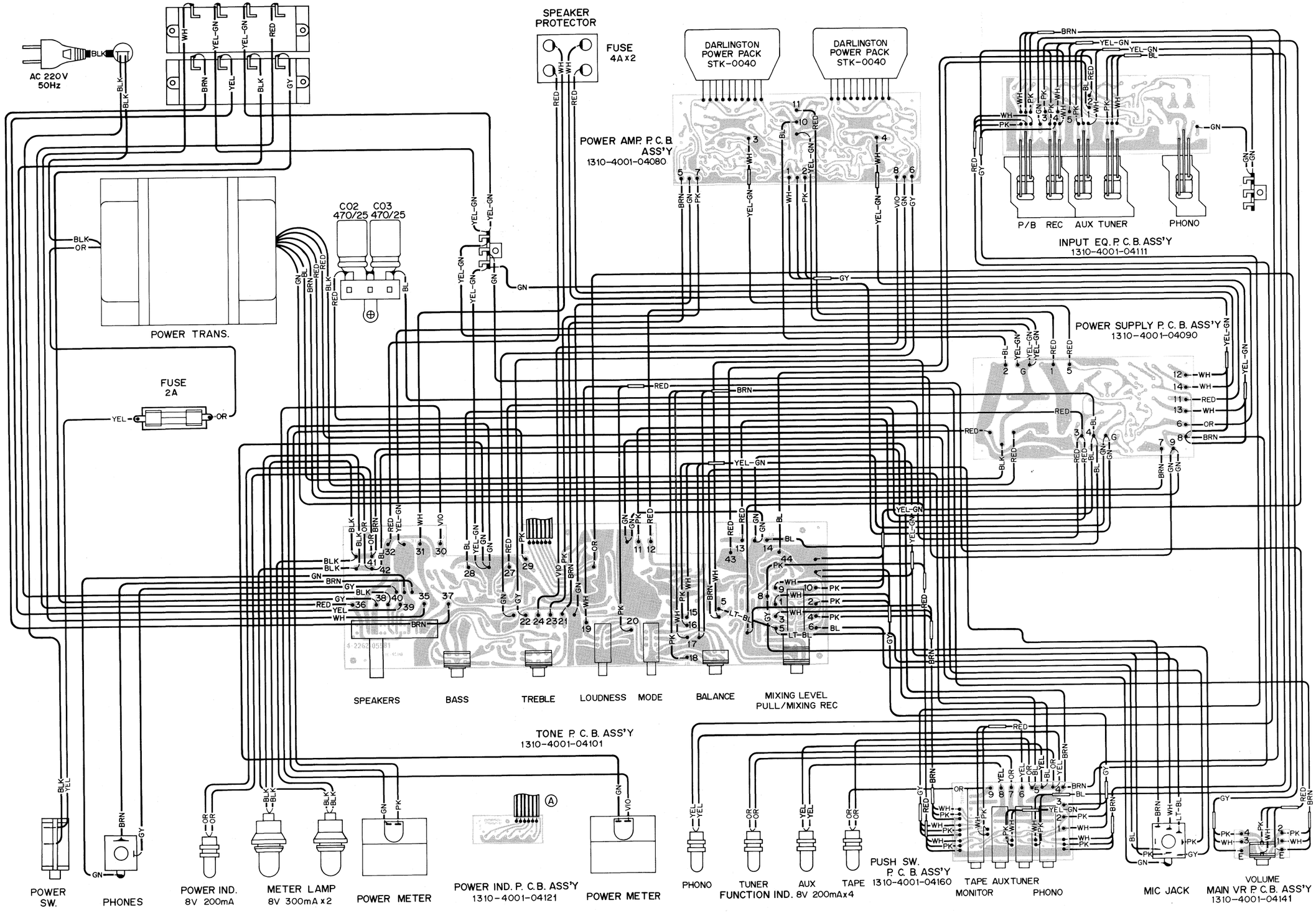
2. Apply the input of 1 kHz to AUX terminal. Then, adjust Master VR until the output voltage of SP terminal becomes 10 V.

3. Adjust VR04 (50 kΩ) until the fifth LED of the level indicator is half-lit.

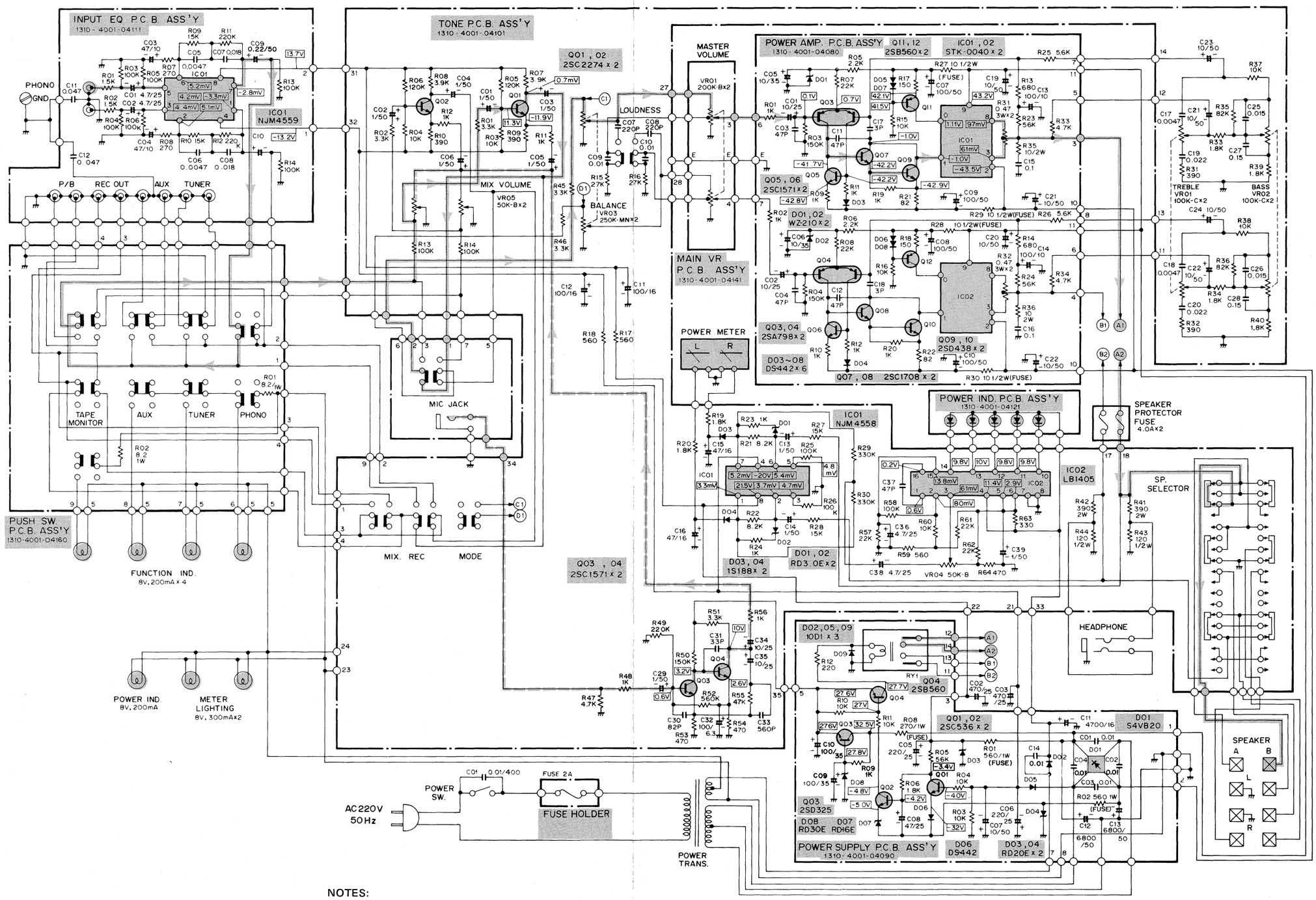
PARTS LOCATION



POINT TO POINT WIRING DIAGRAM



SCHEMATIC DIAGRAM



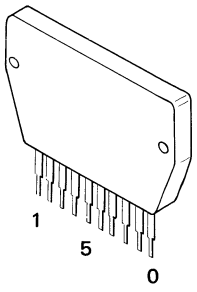
NOTES:

1. All resistors values are indicated in "ohm" (K=10^3, M=10^6).
2. All capacitors values are indicated in "μF" (P=10^{-12}).
3. All voltages indicated on the schematics are measured under the following conditions.
   a. Use a V.T.V.M.
   b. All voltages ±10% with respect to chassis ground
   c. AC input at 220 volts 50 Hz
4. This is a basic schematic diagram.

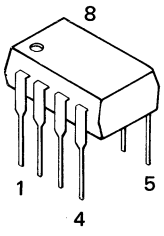
Because Fisher products are subject to continuous improvement, Fisher Corporation reserves the right to make any changes or modifications without notice.

SEMICONDUCTOR LEAD IDENTIFICATION

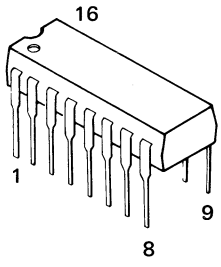
INTEGRATED CIRCUITS



- STK-0040

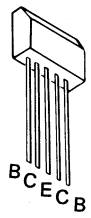


- NJM4558
- NJM4559

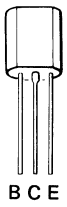


- LB1405

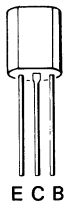
TRANSISTORS



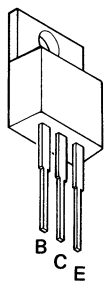
- 2SA798



- 2SC1708

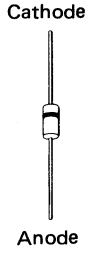


- 2SC1571
- 2SD438
- 2SB560
- 2SC536
- 2SC2274

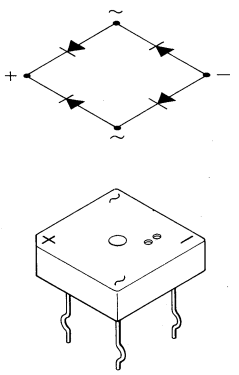


- 2SD325

DIODES



- WZ-210
- DS-442
- 10D1
- RD20E
- RD-16E
- RD30E
- RD3.0E
- 1S188



- S4VB20